What is claimed is:

1. A liquid crystal display device comprising a polymer-stabilized blue phase liquid crystal sandwiched between a pair of clear substrates, wherein the polymer-stabilized blue phase liquid crystal comprises a low molecular weight liquid crystal that allows a blue phase to appear between a cholesteric phase and an isotropic phase and a polymer network formed in the low molecular weight liquid crystal, and an electrical field is applied parallel to the substrates.

2. The liquid crystal display device of claim 1, wherein the polymer-stabilized blue phase liquid crystal contains a chiral dopant and the amount of the chiral dopant per the amount of the polymer-stabilized blue phase liquid crystal is adjusted so that the diffraction wavelength of the polymer-stabilized blue phase liquid crystal is outside visible zone (from 380 nm to 750 nm).

3. The liquid crystal display device of claim 1 or 2, wherein the electrical field is applied using two toothed comb shaped electrodes incorporated alternately in one of the clear substrate surfaces.

4. The liquid crystal display device of claim 1 or 2, wherein a TFT and a common electrode are incorporated in one of the substrate surfaces and the electrical field is applied between the TFT electrode and the common electrode in a form of an electrical field responding to the on-off input signals of the TFT.

5. A polymer-stabilized blue phase liquid crystal, which is constructed from a blue phase of a composite liquid crystal composition comprising a low molecular weight liquid crystal and a polymer network, wherein the low molecular weight liquid crystal allows a blue phase to appear between a cholesteric phase and an isotropic phase and a polymer network is formed by polymerizing non-liquid crystalline monomers along with a crosslinking agent, wherein the polymer-stabilized blue phase liquid crystal contains a chiral dopant and the amount of the chiral dopant per the amount of the polymer-stabilized blue phase liquid crystal is adjusted so that the diffraction wavelength of the polymer-stabilized blue phase liquid crystal is outside visible zone (from 380 nm to 750 nm).